



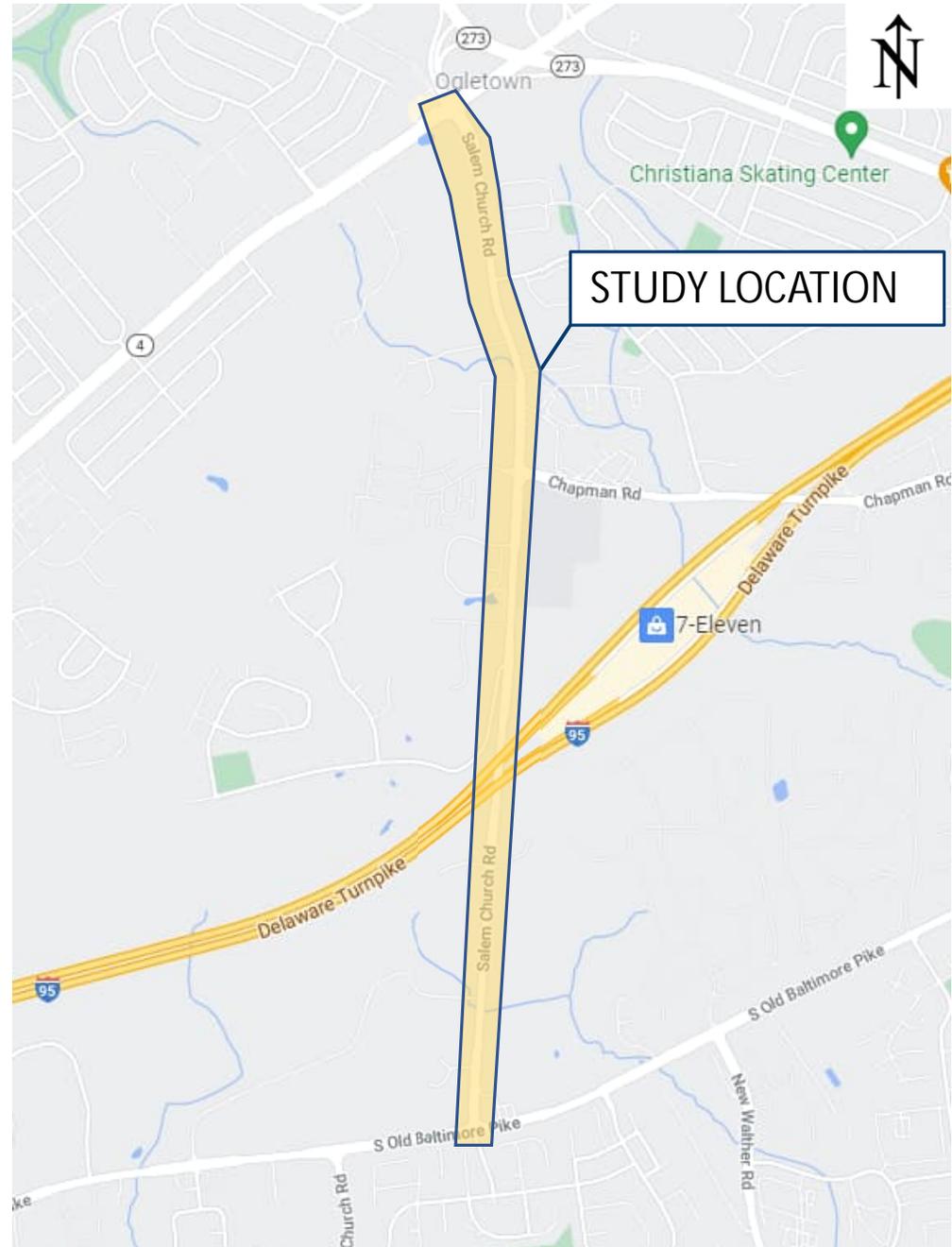
Salem Church Road Pedestrian Safety Study

Old Baltimore Pike to SR 4

October 2023

Study Scope

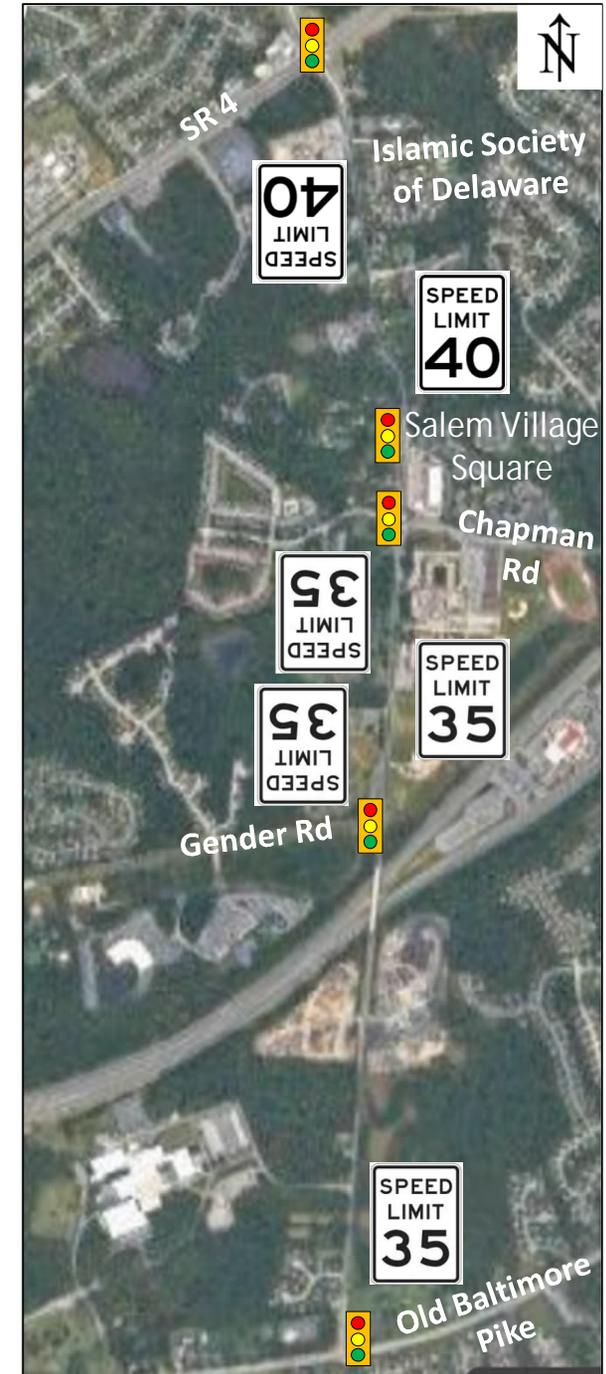
- Review pedestrian and bicycle crash history
- Observe and collect pedestrian, bicycle, transit, and traffic data
- Evaluate pedestrian and bicyclist safety along corridor and identify recommendations



Salem Church Rd Corridor

Existing Conditions

- Posted Speed Limit: 35 MPH and 40 MPH
- AADT (2021 DeIDOT Traffic Summary)
 - Chapman Road to SR 4: 20,192
 - Old Baltimore Pike to Chapman Road: 17,881
- High Pedestrian Activity
 - Salem Church Road at Chapman Road
 - Christiana High School
 - West leg of intersection: Salem Village and Village II Apartments
 - South of SR 4
 - Islamic Society of Delaware

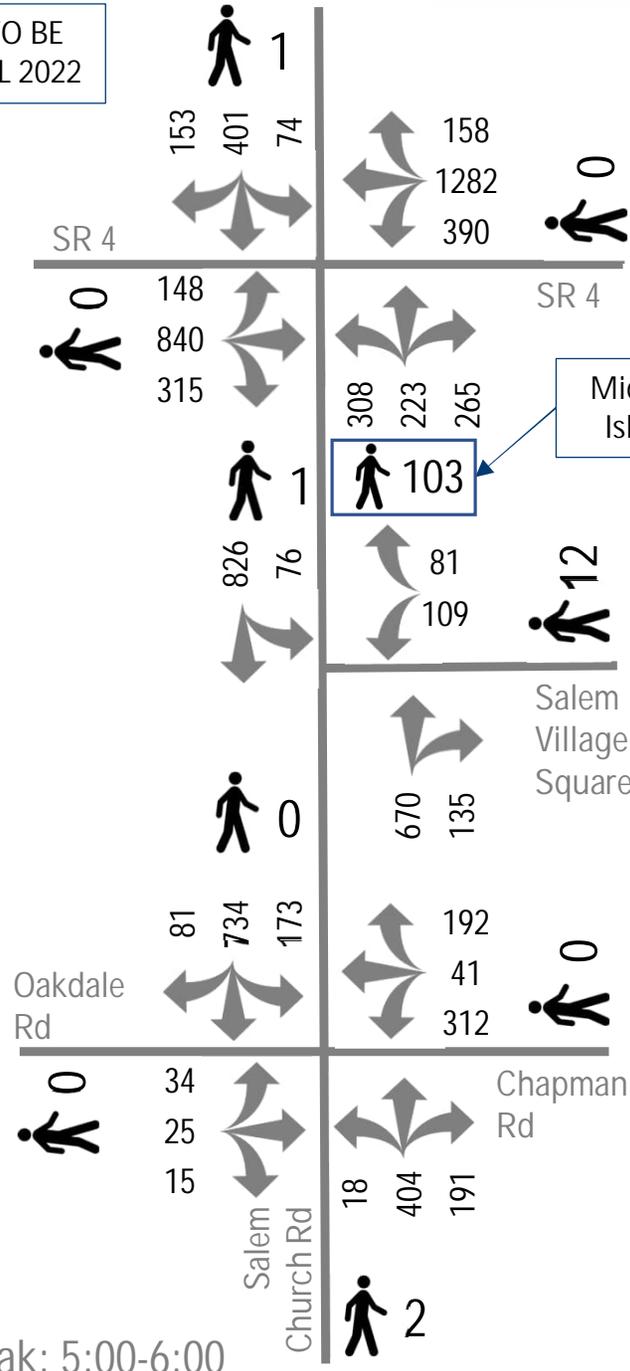
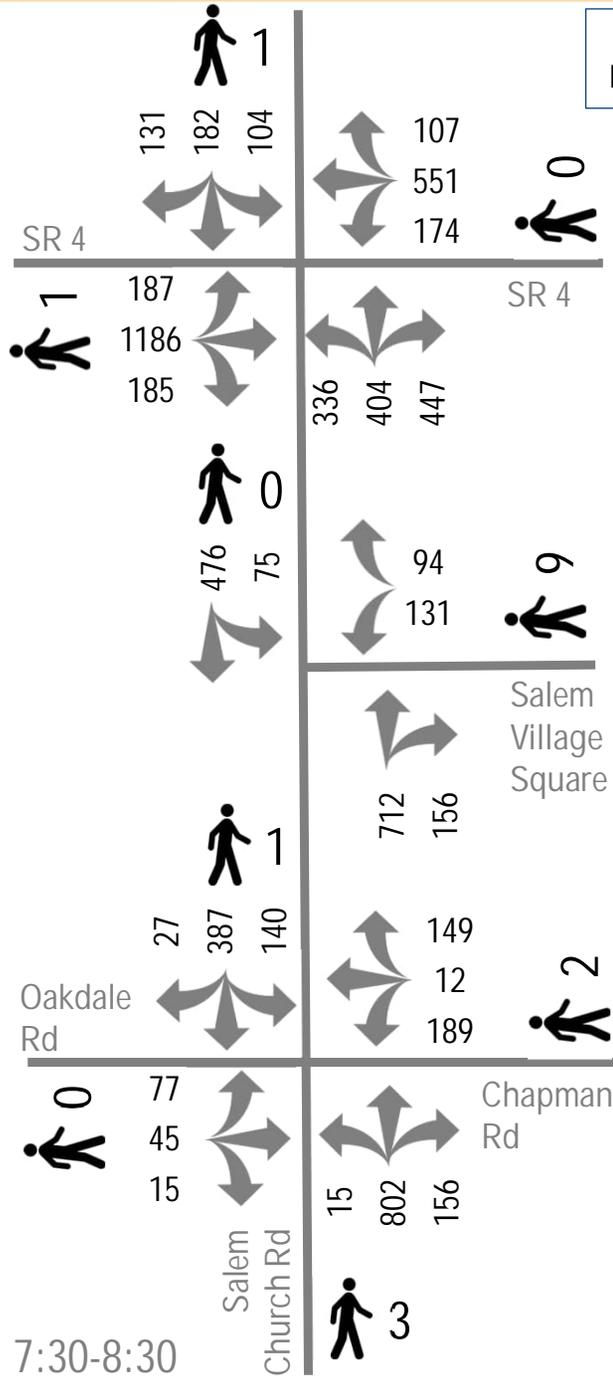


Salem Church Rd Corridor

Traffic Counts



NEW COUNTS TO BE PERFORMED FALL 2022



Midday pedestrian volume at Islamic Society of Delaware

*Salem Village Square Counts took place in Sept. 2009; SR 4 counts took place in March 2019; Oakdale Rd/Chapman Rd counts took place in Nov. 2019

Salem Church Rd Corridor

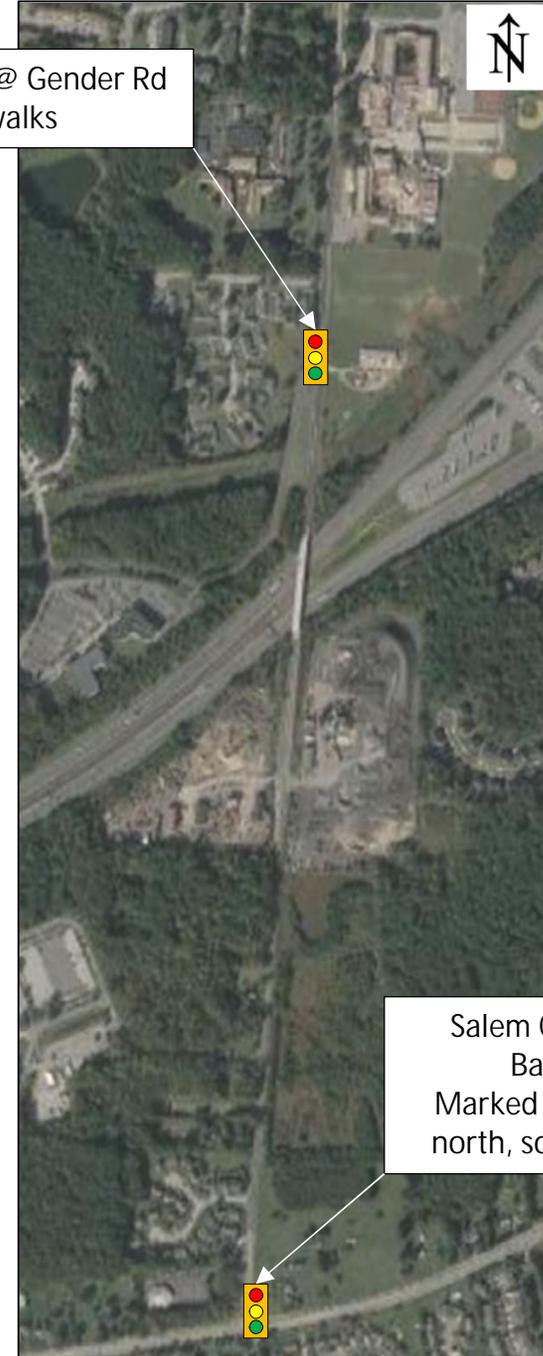
Signalized Pedestrian Crossings on Salem Church Rd



Salem Church Rd @ SR 4
Marked crosswalks on all
4 legs

Salem Church Rd @ Salem
Village Square
Marked crosswalks on the
north and east legs

Salem Church Rd @ Chapman Rd
Marked crosswalks on all 4 legs



Salem Church Rd @ Gender Rd
No crosswalks

Salem Church Rd @ Old
Baltimore Pike
Marked crosswalks on the
north, south, and east legs

Ped/Bike Crash Trends

(January 1st, 2005, to July 22nd, 2022)

- 8 total ped crashes; 4 total bike crashes
- 92% of ped/bike crashes resulted in an injury
- 63% of pedestrian crashes occurred at nighttime
- 58% of ped/bike crashes occurred from 2 PM to 8 PM
- 50% of pedestrian crashes occurred within 200 feet of a signalized crosswalk
- 92% of ped/bike crashes occurred on a weekday
 - 67% of ped/bike crashes occurred on a Thursday or Friday
- 50% of ped/bike crashes involved a ped/cyclist aged 13 to 25 years old
- 42% of ped/bike crashes occurred in the summer

*Feb. 2022 fatal **not** included (was not yet loaded into CARS database)

- On February 18, 2022 at 10:12 PM a 30-year-old bicyclist was killed while traveling in the SB lane between Adel Dr and Old Baltimore Pike. A SB vehicle attempted to veer left at the same time as the bicyclist, resulting in the collision.



Speed Limit Assessment

- Radar speed studies conducted in December 2021
- Average speeds are up to 10 mph higher than the posted speed limit
- 85th-percentile speeds are up to 15 mph higher than the posted speed limit
- Sections with 35 mph speed limits experience the greatest speed differentials

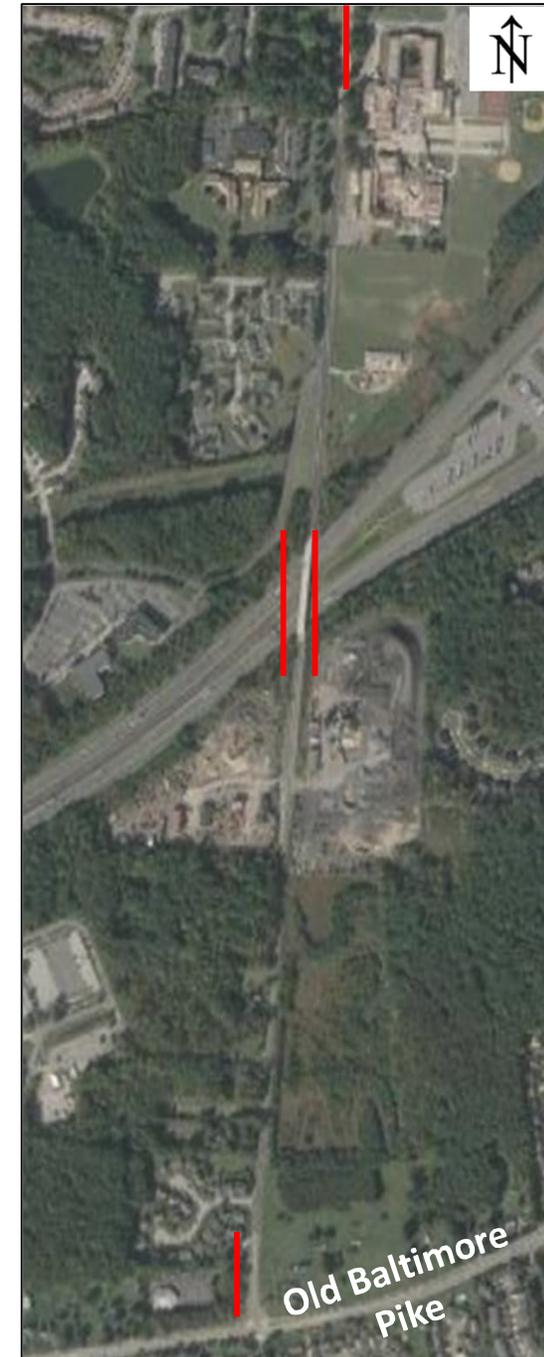
Segment	Location	Posted Speed Limit (mph)	# Travel Lanes per Direction	Northbound Salem Church Road		Southbound Salem Church Road		USLIMITS2 Recommended Speed (mph)
				Average Speed (mph)	85 th -Percentile Speed (mph)	Average Speed (mph)	85 th -Percentile Speed (mph)	
Old Baltimore Pike to Salem Village Square	Mapleshade Road	35	1	42	45	45	50	45
Salem Village Square to SR 4	Dunsmore Drive	40	1	42	45	44	48	45

- Speed data collected for Salem Church Road and input into FHWA's USLIMITS2 program to determine appropriate speed limit recommendations
- **RECOMMENDATION:** implement a consistent corridor speed limit by lowering the 40 mph segment of Salem Church Road to 35 mph

Sidewalk Gap Assessment

- Sidewalks are shown in red

	Beginning Point	Ending Point	Distance
SB Salem Church Road	Salem Village Square Shopping Center	20 ft south of Oakdale Road	625 ft
	Northern edge of I-95 bridge	Southern edge of I-95 bridge	550 ft
	275 ft south of Mapleshade Road	Southern study area limits (Old Baltimore Pike)	320 ft
NB Salem Church Road	Southern edge of I-95 bridge	Northern edge of I-95 bridge	550 ft
	Northern Christiana High School driveway	Sandalwood Drive	1,240 ft
	50 ft south of Elm Drive	Elm Drive	50 ft
		Total sidewalk distance:	3,335 ft



2 miles of roadway = 21,120 ft of possible sidewalk

RECOMMENDATIONS:

- Identify which sidewalk gaps, if any, should be prioritized
- Consider DeIDOT's ADA Transition Plan along the corridor to help improve multi-modal infrastructure

Bus Stop Amenities Assessment

Lighting, Bench, Shelter, Ridership Data



Direction	Location	Shelter/ Bench?	Lit?	Weekday Ridership (November 2021)			Bench Warranted? *	Shelter Warranted? *
				Boardings	Alightings	Total		
NB	Salem Church Road & Chapman Road	None	N	1	2	3	No	No
	Salem Church Road & Elm Drive	None	Y	1	4	5	No	No
	Salem Church Road & Op Salem Ch Pk	None	Y	0	2	2	No	No
SB	Salem Church Road & Salem CH Ind PK	None	Y	2	0	2	No	No
	Salem Church Road & Op Elm Drive	None	Y	3	1	4	No	No
	Salem Church Road & Oakdale Road	None	Y	1	2	3	No	No

* Salem Church Road is considered to have low transit density; therefore, DTC's applicable criteria are as follows:

- Bench: 5 or more boardings per day
- Shelter: 10 or more boardings per day

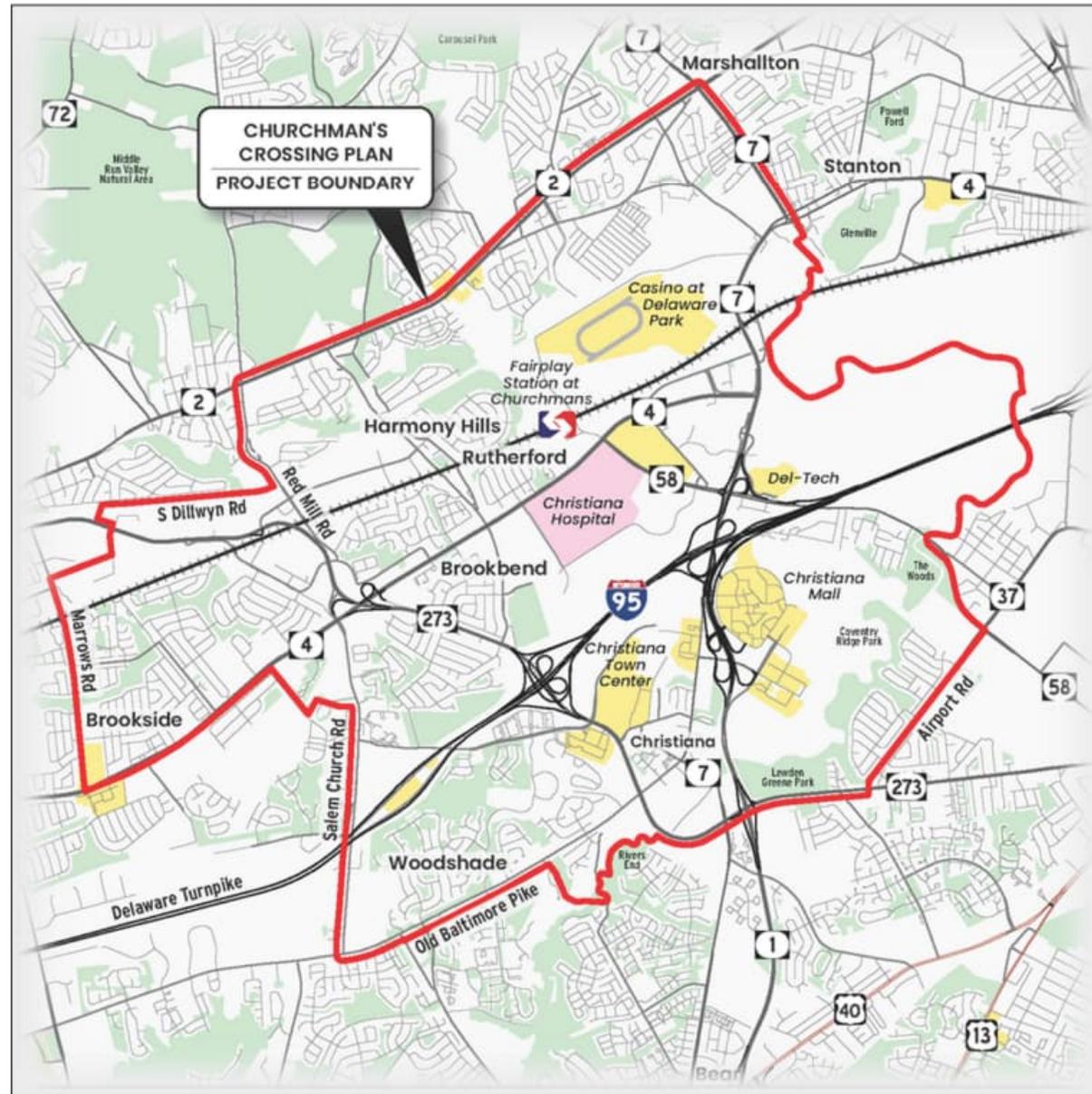
- Bench/shelter criteria **not met** at any Salem Church Road bus stop

• RECOMMENDATIONS:

- Install lighting at Salem Church Road & Chapman Road bus stop that is currently unlit
- Further, due to high percentage of nighttime ped/bike crashes, work with DP&L to install leased lighting throughout the corridor

<http://www.wilmapco.org/churchmans/>

- Published in January 2022
- No projects/studies identified along Salem Church Road other than minor intersection improvements at Old Baltimore Pike, which were recently completed



Additional Areas of Concern Identified Based on Stakeholder Outreach During Safety Study

Islamic Society of Delaware (ISD)

Christiana High School (CHS)

Marydale Retirement Village

**SALEM CHURCH ROAD
AT
ISLAMIC SOCIETY OF DELAWARE**

- Also known as Masjid Ibrahim
- Hold five prayer services each day of the week, with 2 additional services each Friday
- One parking lot with approximately 70 parking spaces on property
- According to their website, overflow parking is located at the Delaware Saengerbund & Library, as well as The Journey church
- Members of the ISD Maintenance Committee contacted legislators in Nov. 2021 to suggest traffic calming measures
 - Including a pedestrian crossing across Salem Church Rd at the ISD entrance and an additional northbound left-turn lane at SR 4



- Occurred on January 14, 2022, between 12:00 PM-1:00 PM to coincide with Islamic Society of Delaware's popular service
- Vehicles utilized the northbound and southbound shoulders to park during ISD service, along with the wide concrete median south of SR 4
- Observed 103 pedestrians cross Salem Church Road during one-hour period
 - No sidewalks or crosswalks are in the vicinity of ISD
- Pedestrians often had trouble finding a gap in traffic to cross the road



- A member of the ISD congregation wore a reflective vest and stopped traffic on Salem Church Road so that pedestrians could cross
 - This person also occasionally stopped traffic for vehicles exiting the business park across from ISD
- The Delaware Saengerbund & Library parking lot was completely full, while The Journey church parking lot contained 3 vehicles
- At approximately 12:50 PM, the “crossing guard” stopped NB traffic to let vehicles exit the ISD parking lot
- Most vehicles parked along the shoulders were cleared at approximately 1:00 PM (it should be noted that after Daylight Saving time on 4/13/22, the peak Friday period changed from 12:00-1:00 PM to 1:00-2:00 PM)



- Record Minor Land Development Plan for Islamic Society of Delaware was completed on January 20, 2000
 - Included a 10,050 SF building add-on and parking spot additions

1997 Aerial Imagery



2002 Aerial Imagery



SITE COVERAGE DATA:

BUILDING AREAS:	EXISTING	PROPOSED	TOTAL
Assembly Area:	2,400 S.F.	2,580 S.F.	4,980 S.F.
Sunday School Area:	400 S.F.	2,970 S.F.	3,370 S.F.
Other Areas:(Lobby, Bath, etc)	<u>1,200 S.F.</u>	<u>4,500 S.F.</u>	<u>5,700 S.F.</u>
Gross Floor Areas:	4,000 S.F.	10,050 S.F.	14,050 S.F.

PARKING RATIONALE:

Required Parking Spaces for 4,980 S.F.
 Assembly Area @ 10 spaces/1,000 S.F. = 50 spaces
 Required Handicapped Spaces = 2 spaces
 Provided Handicapped Spaces = 4 spaces
 Total number of spaces existing = 20 spaces
 Total number of spaces provided = 79 spaces*
 *Includes 4 Handicapped spaces

- A crossing study was conducted on Tuesday, March 15, 2022, in the area of ISD
 - Includes an assessment of motorist compliance in yielding for crossing “staged” pedestrians

	Northbound Salem Church Rd	Southbound Salem Church Rd
Number of Staged Crossings	25	25
Time Spent on Crossing Compliance Study	1 hour 30 minutes	
Speed Limit	40	40
85 th -percentile Speed	45	48
Average Pedestrian Delay	38 sec	43 sec
Percentage of Crossings Where First Vehicle Yielded	4%	4%
Percentage of Yield Crossings	4%	4%
Average Number of Vehicles Not Yielding	96%	96%

- Potential Rectangular Rapid Flashing Beacon (RRFB) Location
 - Ideally between ISD and the Delaware Saengerbund & Library parking lot, where the pedestrian activity is concentrated

RRFB Example

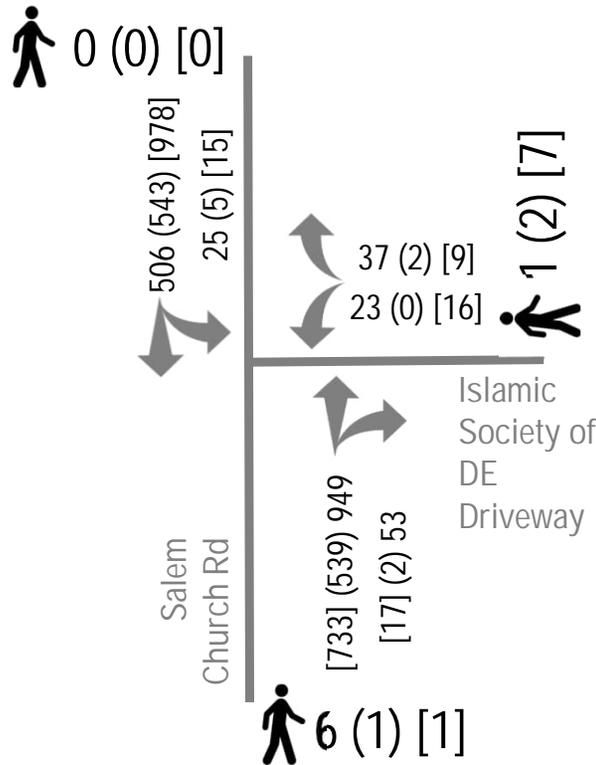
- Potential RRFB Issues
 - No sidewalks
 - Limited right-of-way
 - Abundant drainage infrastructure
 - Proximity to SR 4 signal



- August 11, 2022 Field Meeting with ISD, DeIDOT, Rep. Osienski and Leilani Rhodes (aide to Rep. Wilson-Anton)
- Major safety and operational concerns associated with Friday afternoon prayer service
- Discussed possible pedestrian signal treatments
- Discovered what measures ISD currently has in place for pedestrian safety
 - Right-out ONLY at ISD driveway and German society driveway
 - Crossing guard at ISD driveway and German society driveway
 - Encourages crossing only at ISD driveway
 - Split into two congregations to spread out ped activity
 - 36 Salem Church Rd provides courtesy parking for approx. 15 vehicles
- WRA performed a 13-hour count and full signal warrant analysis at ISD driveway during the school year

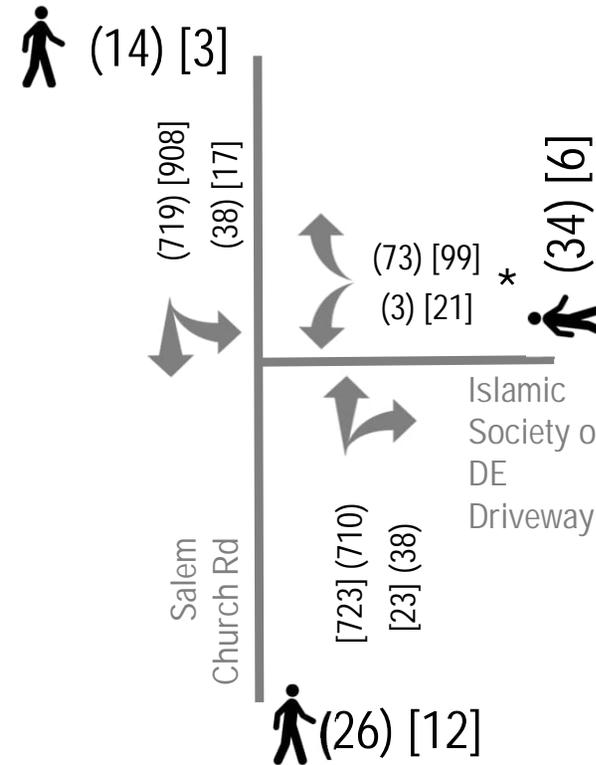
September 2022 ISD Counts

* On 1/10/23, ISD conducted a survey that showed 50% of patrons would turn left at the ISD Driveway if given the chance



Thursday, September 15, 2022
AM (MID) [PM]

AM Peak: 7:30-8:30
MID Peak: 12:00-1:00
PM Peak: 4:00-5:00



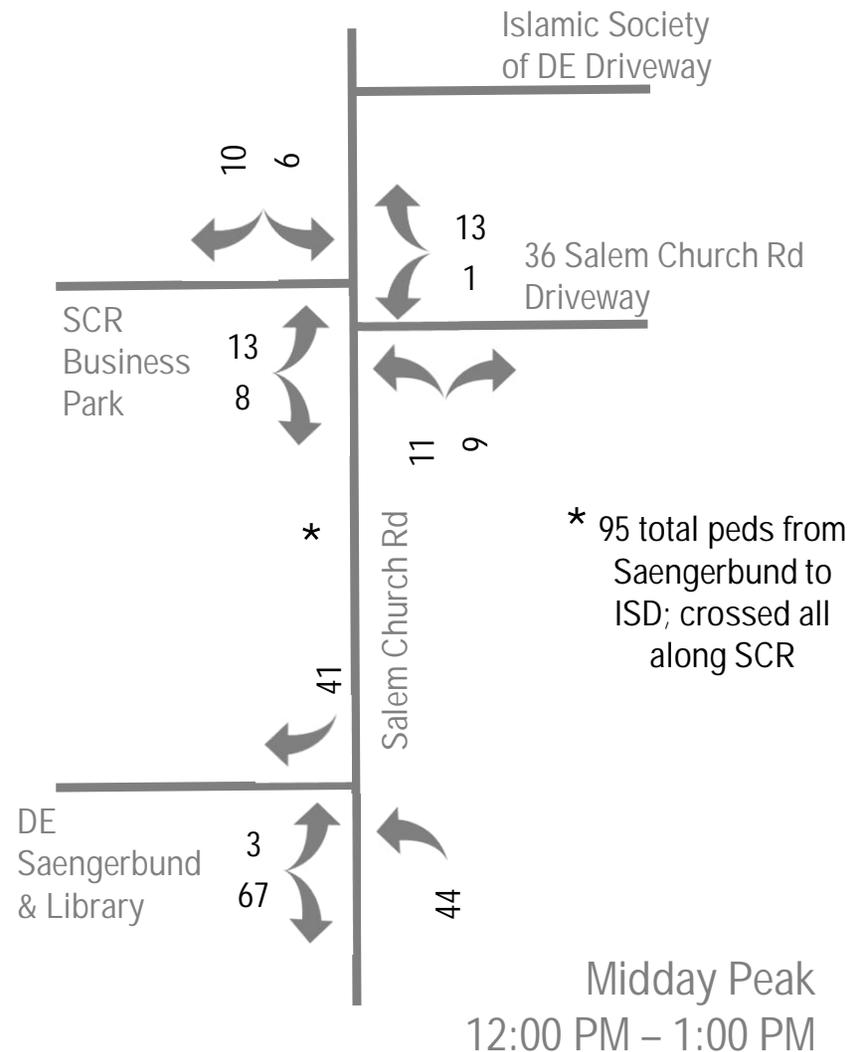
Friday, September 16, 2022
(ENTER) [EXIT]

Peak Event Entering: 1:45-2:45 PM
Peak Event Exiting: 2:45-3:45 PM

Dec/Jan 2022/2023 Driveway Counts



- Turning movement spot counts were performed on Fridays December 30th, 2022, and January 6th, 2023, at the SCR business park driveway and the Delaware Saengerbund & Library, respectively
 - Additional parking (approx. 15 spots) at 36 Salem Church Rd
- Following the Friday ISD service, a “crossing guard” assisted exiting vehicles at the Delaware Saengerbund & Library from 12:40 PM to 12:55 PM
 - This person stopped SB traffic and let approximately 5 cars turn right at a time
 - Pedestrians used this time to cross the street and walk back to their vehicles in the DE Saengerbund & Library parking lot
- 1 SB and 4 NB u-turns were observed at the DE Saengerbund & Library



Existing Conditions

Synchro Capacity Analysis Summary

Movement	AM Peak Hour (7:30 AM – 8:30 AM)	Midday Peak Hour (12:00 PM – 1:00 PM)	PM Peak Hour (4:00 PM – 5:00 PM)
Average Intersection Delay (LOS)	19 s (C)	17 s (C)	5 s (D)
Westbound Left/Right Average Delay	208 s	160 s	135 s
Westbound Left/Right Approach LOS	F	F	F
Westbound Left/Right 95 th -Percentile Queue	255 ft	266 ft	89 ft

*Due to model limitations, it should be noted that pedestrians are not included in the capacity analysis

Signal Warrant Analysis

Using Thursday,
September 15th,
2022 counts

DE MUTCD Warrant	Criteria			No. of Hours Meets Criteria (Warrants 1, 2, 4)		Warrant Criteria Met?
	Major Street Volume (VPH)	Minor Street Volume (VPH)	No. of Hours Required	Actual Conditions (Warrant 3)		
1 – Eight-Hour Vehicular Volume	<i>(Any of the three conditions must be met)</i>					
Cond. A – Min. Vehicular Volume	350	105	8	0	No	No
Cond. B – Interruption of Cont. Traffic	525	53	8	1	No	
Cond. C – Combination of Conditions • 80% of Condition A • 80% of Condition B	280 420	84 43	8 8	0 0	No	
2 – Four-Hour Vehicular Volume	(See Figure 4C-1 or 4C-2)		4	1		No
3 – Peak Hour	<i>(Either of the two conditions must be met)</i>					
Condition A	Delay \geq 4 Veh.-Hrs. Approach Volume \geq 100 vph Entering Volume \geq 800 vph		1	0	No	No
Condition B	(See Figure 4C-3 or 4C-4)		1	0	No	
4 – Pedestrian Volume	<i>(Both of the two conditions must be met)</i>					
Condition A	(See Figure 4C-5 or 4C-6)		4	0	No	No
Condition B	(See Figure 4C-7 or 4C-8)		1	0	No	
5 – School Crossing	(Refer to DE MUTCD Section 4C.06 for Criteria)			-		N/A
6 – Coordinated Signal System	(Refer to DE MUTCD Section 4C.07 for Criteria)			-		N/A
7 – Crash Experience	(Refer to DE MUTCD Section 4C.08 for Criteria)			-		No
Alternative 7 – Crash Experience	(Refer to MUTCD Interim Approval, IA-19 for Criteria)			-		No
8 – Roadway Network	(Refer to DE MUTCD Section 4C.09 for Criteria)			-		N/A
9 – Intersection Near a Grade Crossing	(Refer to DE MUTCD Section 4C.10 for Criteria)			-		N/A

Signal Warrant Analysis

Using Friday,
September 16th,
2022 counts

DE MUTCD Warrant	Criteria			No. of Hours Meets Criteria (Warrants 1, 2, 4)		Warrant Criteria Met?
	Major Street Volume (VPH)	Minor Street Volume (VPH)	No. of Hours Required	Actual Conditions (Warrant 3)		
1 – Eight-Hour Vehicular Volume	<i>(Any of the three conditions must be met)</i>					
Cond. A – Min. Vehicular Volume	350	105	8	1	No	No
Cond. B – Interruption of Cont. Traffic	525	53	8	2	No	
Cond. C – Combination of Conditions • 80% of Condition A • 80% of Condition B	280 420	84 43	8 8	1 1	No	
2 – Four-Hour Vehicular Volume	(See Figure 4C-1 or 4C-2)		4	1		No
3 – Peak Hour	<i>(Either of the two conditions must be met)</i>					
Condition A	Delay \geq 4 Veh.-Hrs. Approach Volume \geq 100 vph Entering Volume \geq 800 vph		1	1	Yes	Yes
Condition B	(See Figure 4C-3 or 4C-4)		1	0	No	
4 – Pedestrian Volume	<i>(Both of the two conditions must be met)</i>					
Condition A	(See Figure 4C-5 or 4C-6)		4	0	No	No
Condition B	(See Figure 4C-7 or 4C-8)		1	0	No	
5 – School Crossing	(Refer to DE MUTCD Section 4C.06 for Criteria)			-		N/A
6 – Coordinated Signal System	(Refer to DE MUTCD Section 4C.07 for Criteria)			-		N/A
7 – Crash Experience	(Refer to DE MUTCD Section 4C.08 for Criteria)			-		No
Alternative 7 – Crash Experience	(Refer to MUTCD Interim Approval, IA-19 for Criteria)			-		No
8 – Roadway Network	(Refer to DE MUTCD Section 4C.09 for Criteria)			-		N/A
9 – Intersection Near a Grade Crossing	(Refer to DE MUTCD Section 4C.10 for Criteria)			-		N/A

Traffic Signal (and consider additional SBL lane)

SimTraffic Capacity Analysis Summary

Movement	AM Peak Hour (7:30 AM – 8:30 AM)		Midday Peak Hour* (12:00 PM – 1:00 PM)		PM Peak Hour (4:00 PM – 5:00 PM)	
	Signal	Signal + SBL	Signal	Signal + SBL	Signal	Signal + SBL
Average Intersection Delay (LOS)	11 s (B)	8 s (A)	11 s (B)	10 s (A)	6 s (A)	5 s (A)
Northbound Through						
Average Delay (LOS)	8 s (A)	9 s (A)	9 s (A)	10 s (A)	4 s (A)	4 s (A)
95 th -Percentile Queue (ft)	345	327	302	316	154	168
Southbound Through						
Average Delay (LOS)	10 s (A)	4 s (A)	11 s (B)	7 s (A)	6 s (A)	4 s (A)
95 th -Percentile Queue (ft)	235	158	256	243	246	191
Westbound Left/Right						
Average Delay (LOS)	69 s (E)	49 s (D)	57 s (E)	49 s (D)	45 s (D)	46 s (D)
95 th -Percentile Queue (ft)	170	87	147	136	62	63

*Midday peak hour was modeled using Friday volumes and 30 pedestrian calls per hour

All scenarios include an exclusive pedestrian phase

Crossing Control Options Considered

- Rectangular Rapid-Flashing Beacon (RRFB)
 - Would be constantly activated (flashing nonstop) during ISD service times due to frequent pedestrian crossings
 - Instant activation upon actuation may frustrate Salem Church Rd drivers
 - Relies on consistent driver understanding and compliance
 - Provides no vehicular benefits to ISD driveway traffic
- Pedestrian-Only Signal
 - Clearer indication to both vehicles and pedestrians for improved safety
 - Would be coordinated with nearby SR 4 traffic signal, requiring pedestrians to “group” and wait their turn, mitigating impacts to Salem Church Rd
 - Would not serve ISD driveway traffic, despite proximity of crossing
- Full-Color 24/7 Signal
 - Balances pedestrian safety, ISD driveway service needs, and heavy Salem Church Rd bypass traffic – **but must consider other nearby access points**

ISD and Nearby Access Points



RECOMMENDATION:

- Planning-level study to explore opportunities for potential access point consolidation and pedestrian connections
- Signal warrants are met with ISD traffic; however, impacts to other nearby access points must be considered

**SALEM CHURCH ROAD
AT
SR 4**

SR 4 at Salem Church Road

- ISD personnel indicated that a second NB left-turn lane would mitigate traffic delays during ISD dismissal periods
 - Taken from raised concrete median area
 - Analysis indicated improved delays and queuing for NBL and overall intersection



Synchro Capacity Analysis Summary

Movement	AM Peak Hour (7:30 AM – 8:30 AM)		Midday Peak Hour (12:00 PM – 1:00 PM)		PM Peak Hour (5:00 PM – 6:00 PM)	
	Existing	2 NBL	Existing	2 NBL	Existing	2 NBL
Average Intersection Delay (LOS)	55 s (E)	48 s (D)	35 s (D)	33 s (C)	64 s (E)	52 s (D)
NB Left-Turn Movement						
Average Delay (LOS)	121 s (F)	69 s (E)	69 s (E)	54 s (D)	237 s (F)	72 s (E)
95 th -Percentile Queue (ft)	#564	215	#263	113	#615	214
NB Through Movement						
Average Delay (LOS)	44 s (D)	51 s (D)	41 s (D)	45 s (D)	47 s (D)	49 s (D)
95 th -Percentile Queue (ft)	215	221	74	76	136	136

*Splits were kept the same in each scenario for comparison purposes
 #95th percentile volume exceeds capacity, queue may be longer

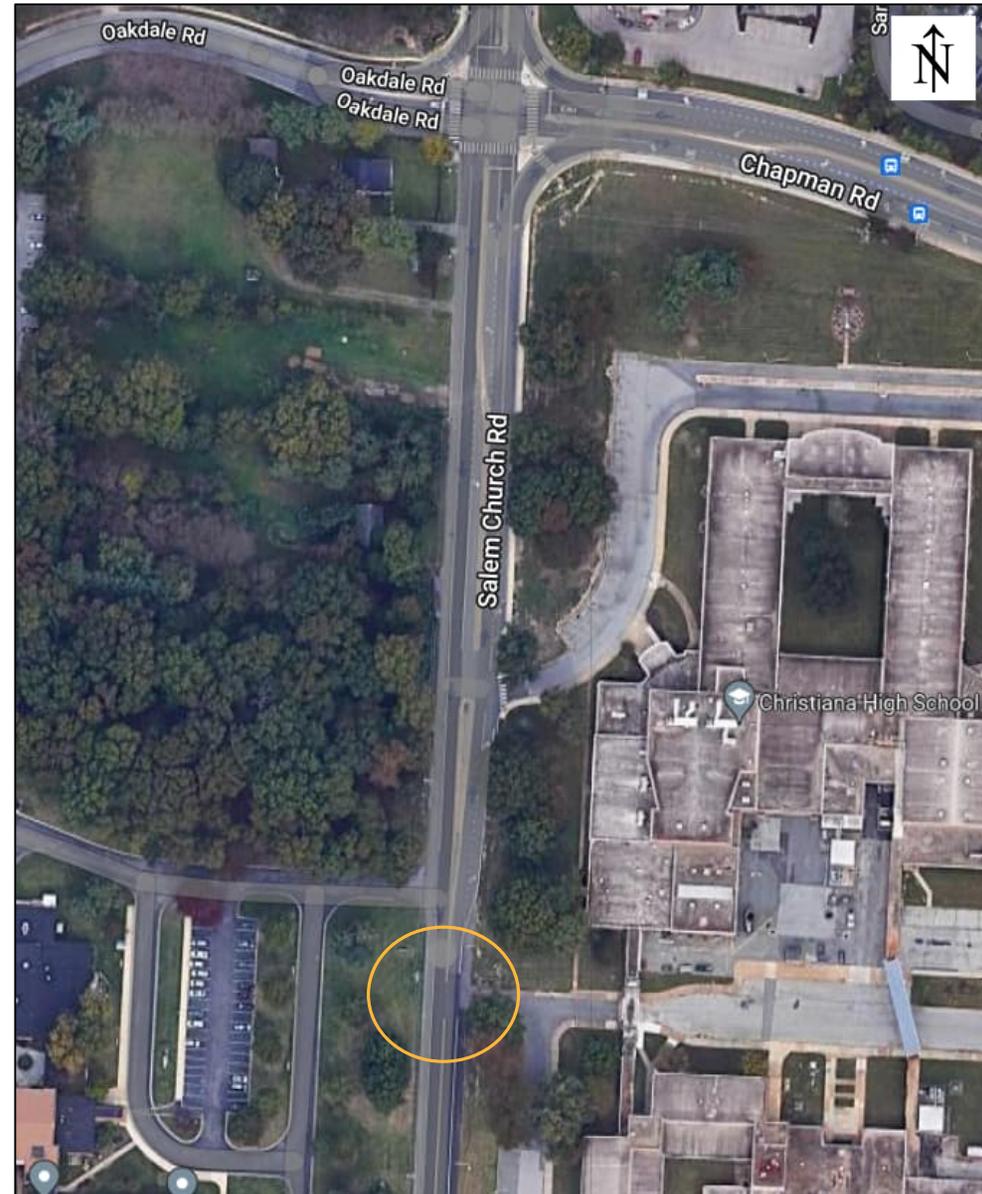
RECOMMENDATION:

- Install additional northbound left-turn lane using existing concrete median area
- **STATUS: DESIGN COMPLETE**
- **GOAL: READY FOR SIGNAL CONSTRUCTION IN FY2024**

**SALEM CHURCH ROAD
AT
CHRISTIANA HIGH SCHOOL &
GENDER ROAD**

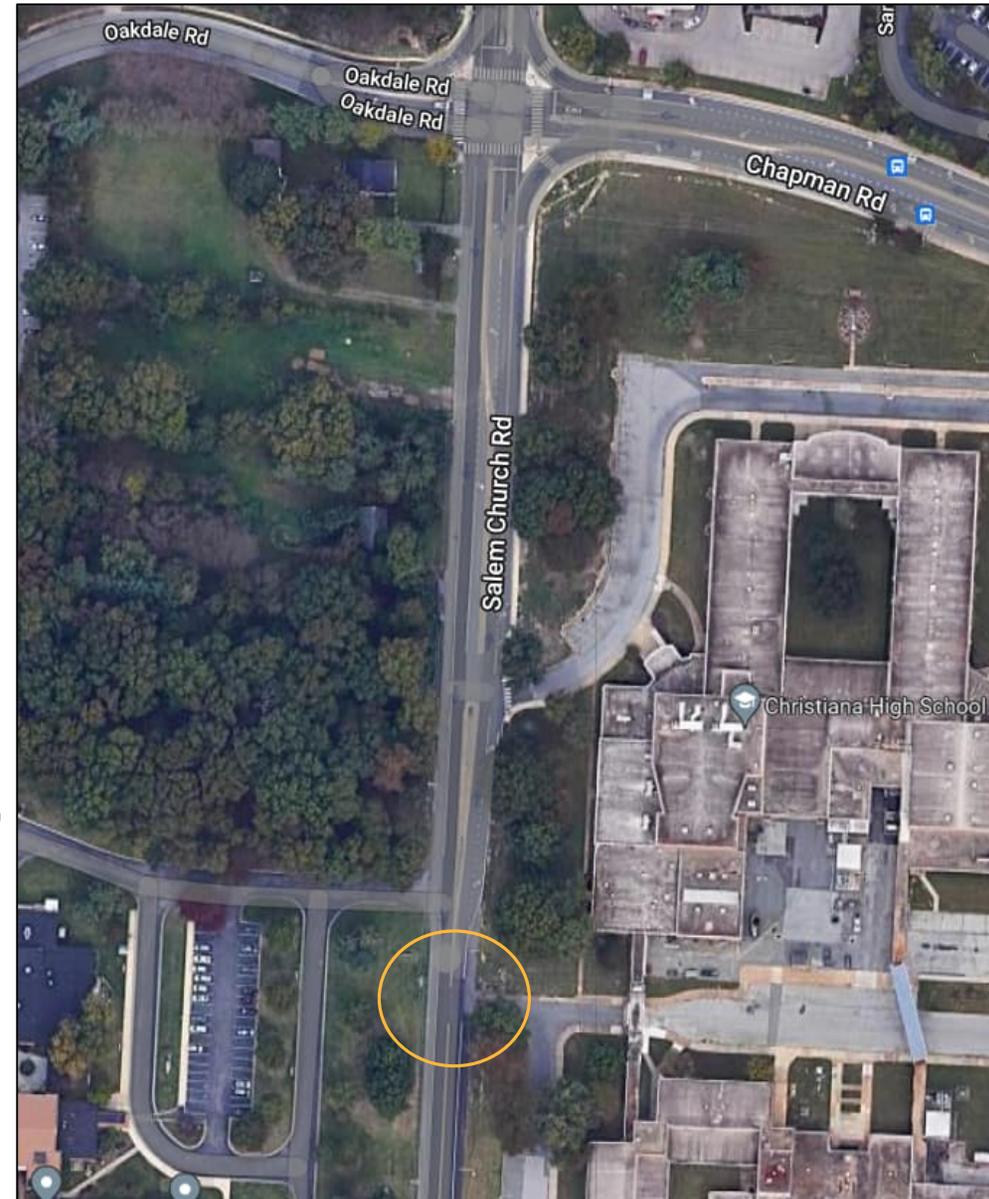
Traffic Signal Request

- In October 2022, the Superintendent of Christina School District, Dr. Dan Shelton, contacted Representative Osienski
- Dr. Shelton indicated the need for a traffic signal at the school's driveway now that the crossing guards have been pulled from that driveway due to staff shortages
 - In 2021, Christiana High School, New Castle County crossing guards, and Delaware State Police (School Resource Officer) enforced right-out-only
- WRA performed observations and a full count at the intersection



Field Observations

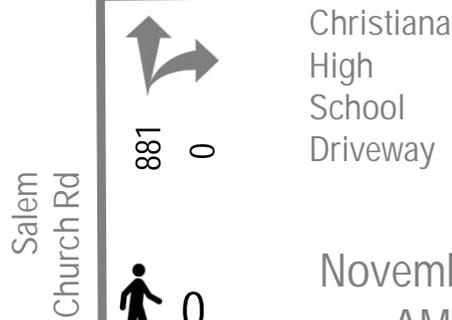
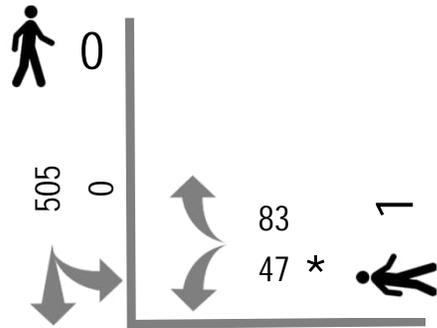
- AM Peak: Performed on November 2nd, 2022 (7:05 school start time)
 - Observed no staff assisting with arrivals
 - NB right-turn queue extended from the southern driveway onto the NB shoulder of Salem Church Rd, occasionally
 - Observed one NB bicyclist in shoulder
 - The NB queue at Chapman Rd extended to the school driveway twice, causing confusion between WBL vehicles and NB vehicles waving for them to proceed
- PM Peak: Performed on October 27th, 2022 (2:05 school dismissal time)
 - Observed one staff member with a neon vest manually stopping NB/SB traffic
 - Staff member stopped Salem Church Rd traffic 5 times to let cars and buses exit
 - NB right-turn queue extended from the southern driveway onto the NB shoulder



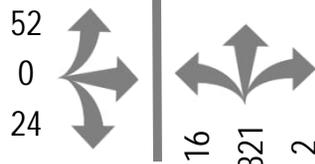
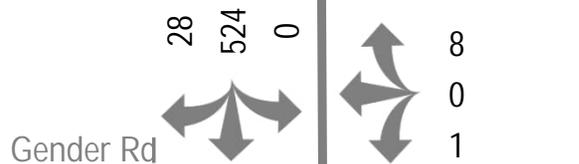
Traffic Counts

* 2021: Christiana High School, New Castle County crossing guards, and Delaware State Police (School Resource Officer) enforced right-out-only

Arrival

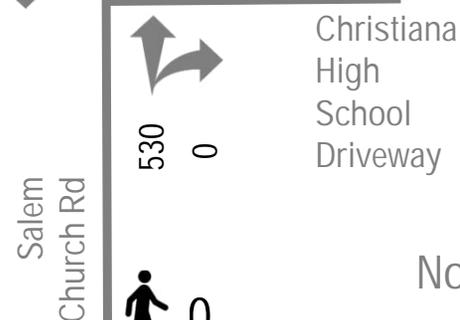
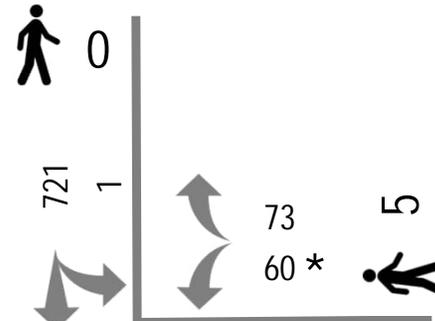


Thursday,
November 3rd, 2022
AM (7:00 – 8:00)

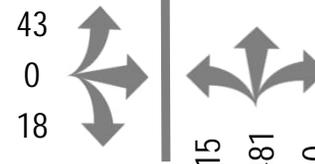
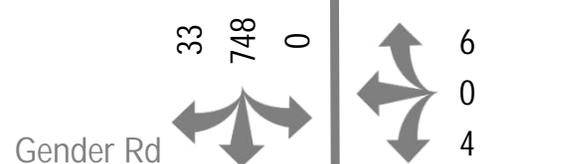


Wednesday,
January 25th, 2023
AM (7:00 – 8:00)

Dismissal



Thursday,
November 3rd, 2022
PM (2:00 – 3:00)



Tuesday,
January 24th, 2023
PM (2:00 – 3:00)

Existing Conditions

Synchro Capacity Analysis Summary

Movement	AM Peak Hour (7:00 AM – 8:00 AM)	PM Peak Hour (2:00 PM – 3:00 PM)
Average Intersection Delay (LOS)	3 s (A)	4 s (A)
Westbound Left/Right Average Delay / Approach LOS	34 s / D	43 s / E
Westbound Left/Right 95 th -Percentile Queue	74 ft	92 ft
Northbound Through Average Delay / Approach LOS	0 s / A	0 s / A
Northbound Through 95 th -Percentile Queue	0 ft	0 ft
Southbound Through Average Delay / Approach LOS	0 s / A	0 s / A
Southbound Through 95 th -Percentile Queue	0 ft	0 ft

*Due to model limitations, it should be noted that pedestrians are not included in the capacity analysis

Signalized Conditions

Synchro Capacity Analysis Summary

Movement	AM Peak Hour (7:00 AM – 8:00 AM)	PM Peak Hour (2:00 PM – 3:00 PM)
Average Intersection Delay (LOS)	29 s (C)	17 s (B)
Westbound Left/Right Average Delay / Approach LOS	124 s / F	66 s / E
Westbound Left/Right 95 th -Percentile Queue	101 ft	89 ft
Northbound Through Average Delay / Approach LOS	12 s / B	6 s / A
Northbound Through 95 th -Percentile Queue	506 ft	177 ft
Southbound Through Average Delay / Approach LOS	5 s / A	9 s / A
Southbound Through 95 th -Percentile Queue	158 ft	#175 ft

*Due to model limitations, it should be noted that pedestrians are not included in the capacity analysis

Volume for 95th percentile queue is metered by upstream signal

Signal Warrant Analysis - CHS

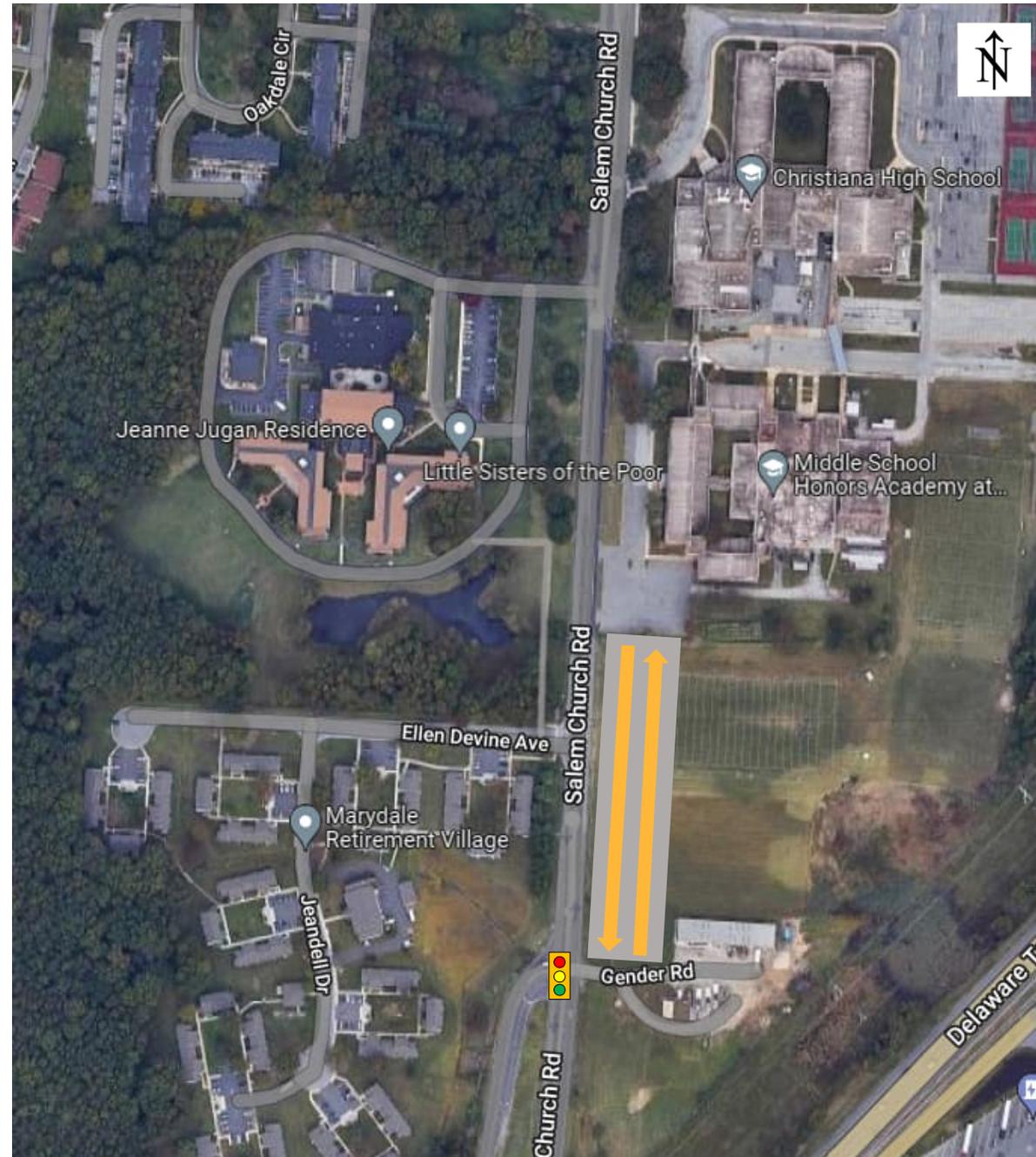


Using Thursday,
November 3rd,
2022 counts

DE MUTCD Warrant	Criteria			No. of Hours Meets Criteria (Warrants 1, 2, 4) Actual Conditions (Warrant 3)		Warrant Criteria Met?
	Major Street Volume (VPH)	Minor Street Volume (VPH)	No. of Hours Required			
1 – Eight-Hour Vehicular Volume	<i>(Any of the three conditions must be met)</i>					
Cond. A – Min. Vehicular Volume	350	105	8	2	No	No
Cond. B – Interruption of Cont. Traffic	525	53	8	2	No	
Cond. C – Combination of Conditions • 80% of Condition A • 80% of Condition B	280 420	84 43	8 8	2 2	No	
2 – Four-Hour Vehicular Volume	(See Figure 4C-1 or 4C-2)		4	2		No
3 – Peak Hour	<i>(Either of the two conditions must be met)</i>					
Condition A	Delay ≥ 4 Veh.-Hrs. Approach Volume ≥ 100 vph Entering Volume ≥ 800 vph		1	2	Yes	Yes
Condition B	(See Figure 4C-3 or 4C-4)		1	1	Yes	
4 – Pedestrian Volume	<i>(Both of the two conditions must be met)</i>					
Condition A	(See Figure 4C-5 or 4C-6)		4	0	No	No
Condition B	(See Figure 4C-7 or 4C-8)		1	0	No	
5 – School Crossing	(Refer to DE MUTCD Section 4C.06 for Criteria)			-		No
6 – Coordinated Signal System	(Refer to DE MUTCD Section 4C.07 for Criteria)			-		N/A
7 – Crash Experience	(Refer to DE MUTCD Section 4C.08 for Criteria)			-		No
Alternative 7 – Crash Experience	(Refer to MUTCD Interim Approval, IA-19 for Criteria)			-		No
8 – Roadway Network	(Refer to DE MUTCD Section 4C.09 for Criteria)			-		N/A
9 – Intersection Near a Grade Crossing	(Refer to DE MUTCD Section 4C.10 for Criteria)			-		N/A

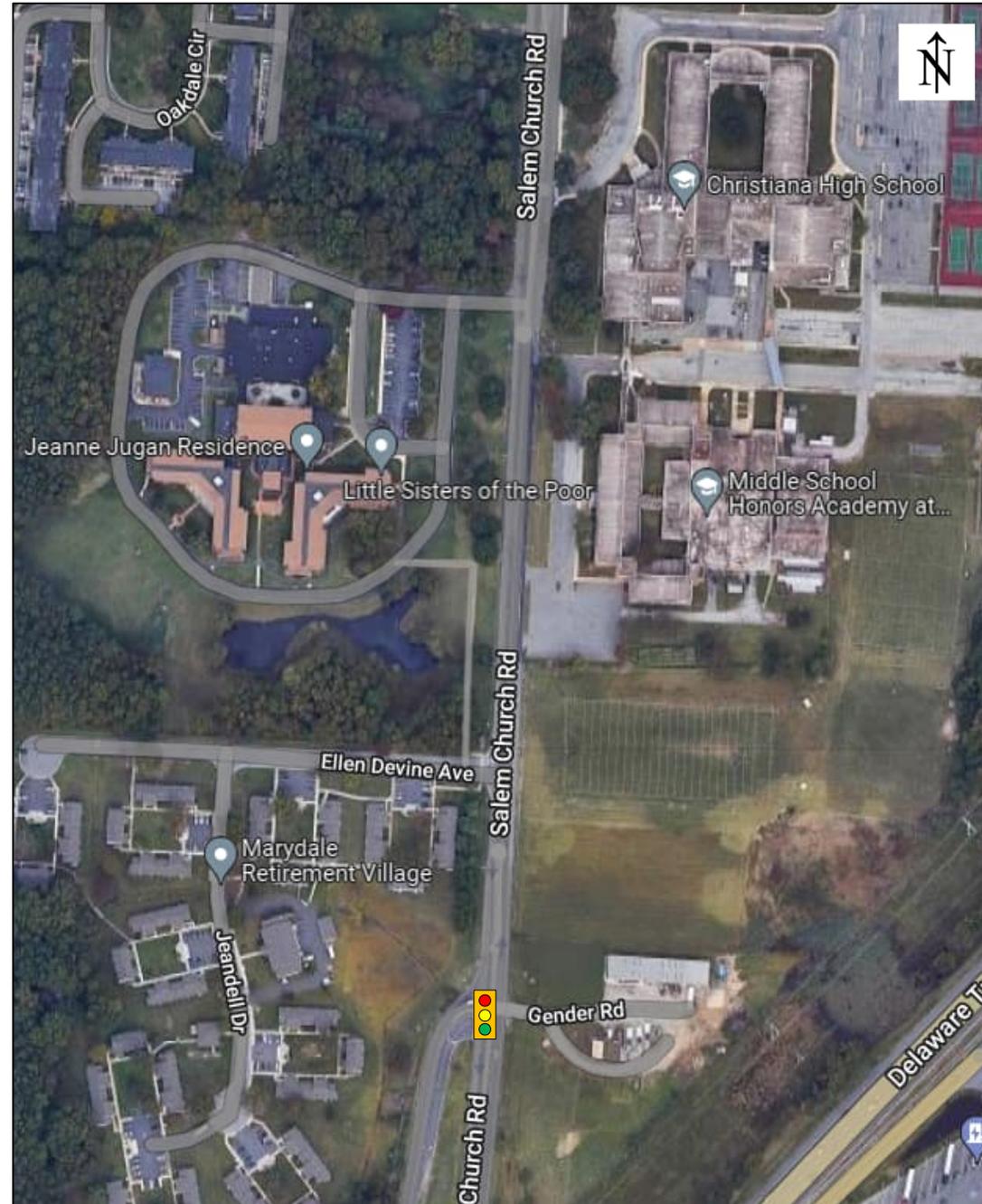
*It should be noted that only the arrival (7:00 AM – 8:00 AM) and dismissal (2:00 PM – 3:00 PM) hours were counted

- Establishing a connector road between the school parking lot and the east leg of Gender Road would:
 - Better serve left-turns out of the school parking lot
 - Be more cost-effective than constructing a new signal
 - Reduce congestion by avoiding the addition of a new signal between Chapman Road and Gender Road
- Christina School District owns the east leg Gender Road parcel of land
- Diverting CHS (exit-only) traffic to Gender Road signal would result in LOS B for arrival and dismissal periods



RECOMMENDATION:

- Planning-level study to explore opportunities for access point consolidation and potential Christiana High School access to signalized intersection
- Potential solutions should include adding a signalized crosswalk to Salem Church Road at Gender Road



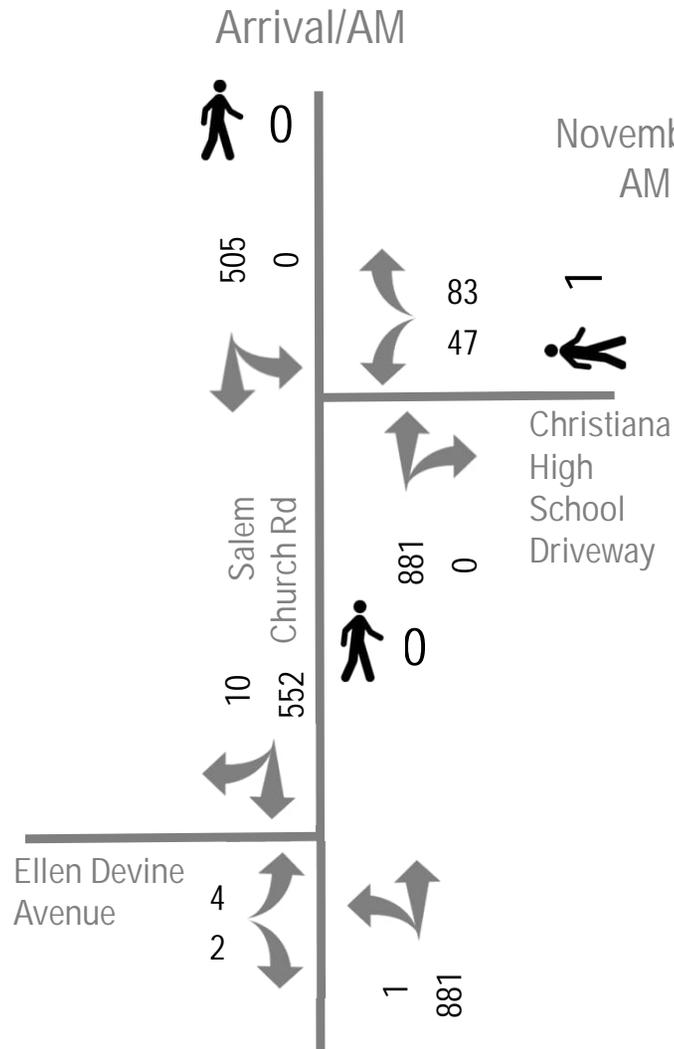
**SALEM CHURCH ROAD
AT
MARYDALE RETIREMENT VILLAGE**

February 8th, 2023

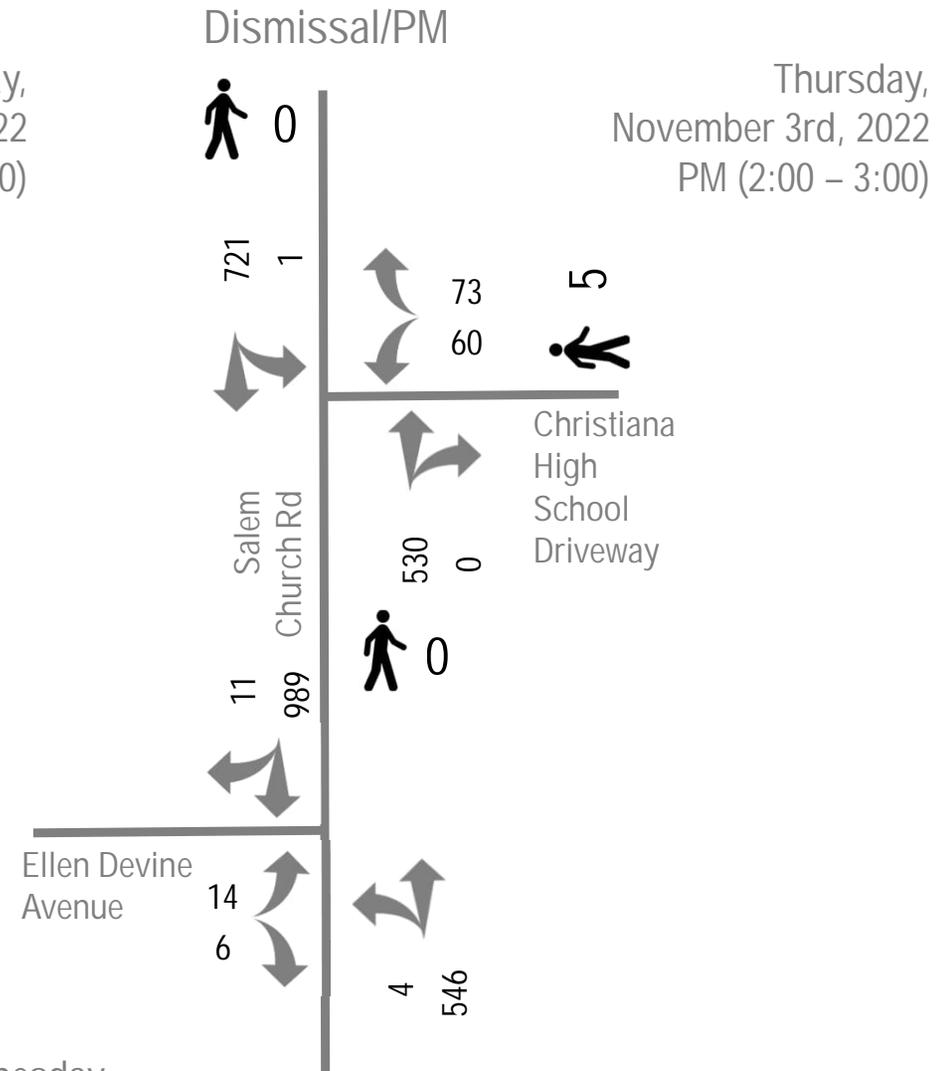
- Met with Rep. Osienski, Sonya LaGrand, and Marydale residents at the Marydale Retirement Village
- Residents inquired about various concerns
 - Extending the right-turn lane into Marydale
 - Converting TWSC to a signal or flashing beacon
 - Adding “DO NOT BLOCK INTERSECTION” signing/stripping
 - Queuing on NB shoulder at CHS during dismissal time making it difficult to turn in/out of Marydale
 - Re-stripping crosswalk(s)
 - Restricting NB shoulder bypassing (mentioned crash problem with NB bypassers and EBL movement)
- Rep. Osienski stated that re-installing tubular markers at Ellen Devine Ave channelizing island would be helpful

Traffic Counts

CHS counts completed on 11/3/22; Ellen Devine Ave counts completed on 1/18/23



Wednesday,
January 18th, 2023
AM (7:30 – 8:30)



Wednesday,
January 18th, 2023
PM (4:00 – 5:00)

Total Crashes

(January 11th, 2018, to January 11th, 2023)

9 crashes – 2 resulted in injury (0 pedestrian/bike crashes)

- 2 SB rear end crashes
 - Both were approaching Gender Rd signal
- 2 SB sideswipe crashes
 - Involved vehicles passing in the shoulder
- 2 SB roadway departure crashes
 - Vehicles swerved to avoid hitting suddenly stopped vehicles
- 1 EBL/SB angle crash
 - EBL vehicle did not see SB vehicle
- 1 NB rear end crash
 - Involved queue due to NBL vehicle at Ellen Devine Ave
- 1 SB improper u-turn crash
 - Conducted u-turn from SB right-turn lane



Crash Trends

- 78% of crashes took place in the daylight
- 89% of crashes took place on a weekday
- 44% of crashes occurred with wet roadway conditions
- 56% of crashes took place between 2 PM and 9 PM
- 44% of crashes were due to “driver inattention”



- Full-width shoulders are shown in blue
- No existing bike lanes on this portion of Salem Church Road
- Not presently programmed for resurfacing

	Beginning Point	Ending Point	Distance
NB Salem Church Road	Christiana High (south) School driveway	Christiana High (north) School driveway	550 ft
SB Salem Church Road	Little Sisters of the Poor driveway	Christiana High (south) School driveway	600 ft
	Gender Road	250 ft south of Gender Road	250 ft
		Total shoulder distance:	1,400 ft



Field Observations

- Occurred on January 18, 2023, between 7:30 AM – 8:30 AM and 4:00 PM – 5:00 PM
- Sight distance is obstructed by small building on the NW corner and trees on the SW corner
 - Caused vehicles to pull up approx. 25 feet beyond the stop line (shown on the right)
- One pedestrian was observed during the AM observations
- One pedestrian and one bicyclist were observed during the PM observations
- Sidewalk continues from Ellen Devine Avenue to the Little Sisters of the Poor property and then terminates
- Signs and pavement markings in good shape



Sight Distance

Intersection Sight Distance		
Required	Looking Left	Looking Right
	390 ft	390 ft
Measured	Looking Left	Looking Right
	130 ft	140 ft
Pulled Up	Looking Left	Looking Right
	700 ft	750 ft

Table 9-6 was used from the 7th Edition 2018 AASHTO 'A Policy on Geometric Design of Highways and Streets'



Sight Distance Looking Left



Sight Distance Looking Right



Pulled Forward - Looking Left



Pulled Forward - Looking Right

Queuing Study & Delay Study

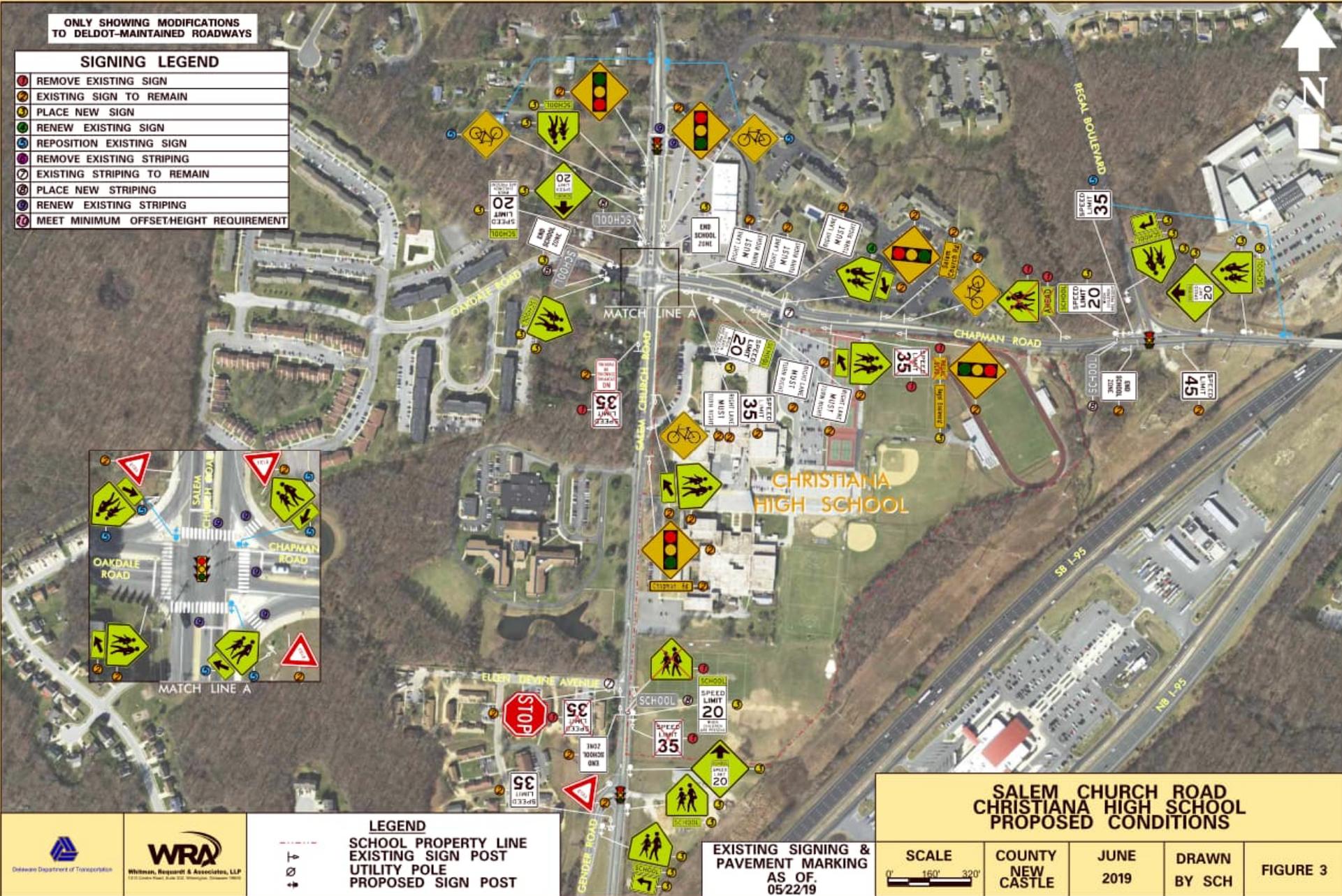


- Both studies occurred on January 30, 2023, between 4:00 PM – 5:00 PM
- Despite high traffic volumes on Salem Church Rd, the average delay per vehicle for turning vehicles was 37 seconds
 - Observed 19 approach vehicles
 - 14 left turns
 - 5 right turns
- 10 out of 22 queues in the PM peak hour impacted intersection sight distance

Queuing Study - SB Salem Church Rd at Gender Rd			
Time	Queue Length (vehicles)	Time	Queue Length (vehicles)
4:00 PM	5	4:33 PM	10
4:03 PM	5	4:36 PM	2
4:06 PM	1	4:39 PM	2
4:09 PM	0	4:42 PM	12
4:12 PM	7	4:45 PM	7
4:15 PM	3	4:48 PM	9
4:18 PM	8	4:51 PM	5
4:21 PM	7	4:54 PM	16
4:24 PM	7	4:57 PM	5
4:27 PM	5	5:00 PM	8
4:30 PM	4	5:03 PM	5

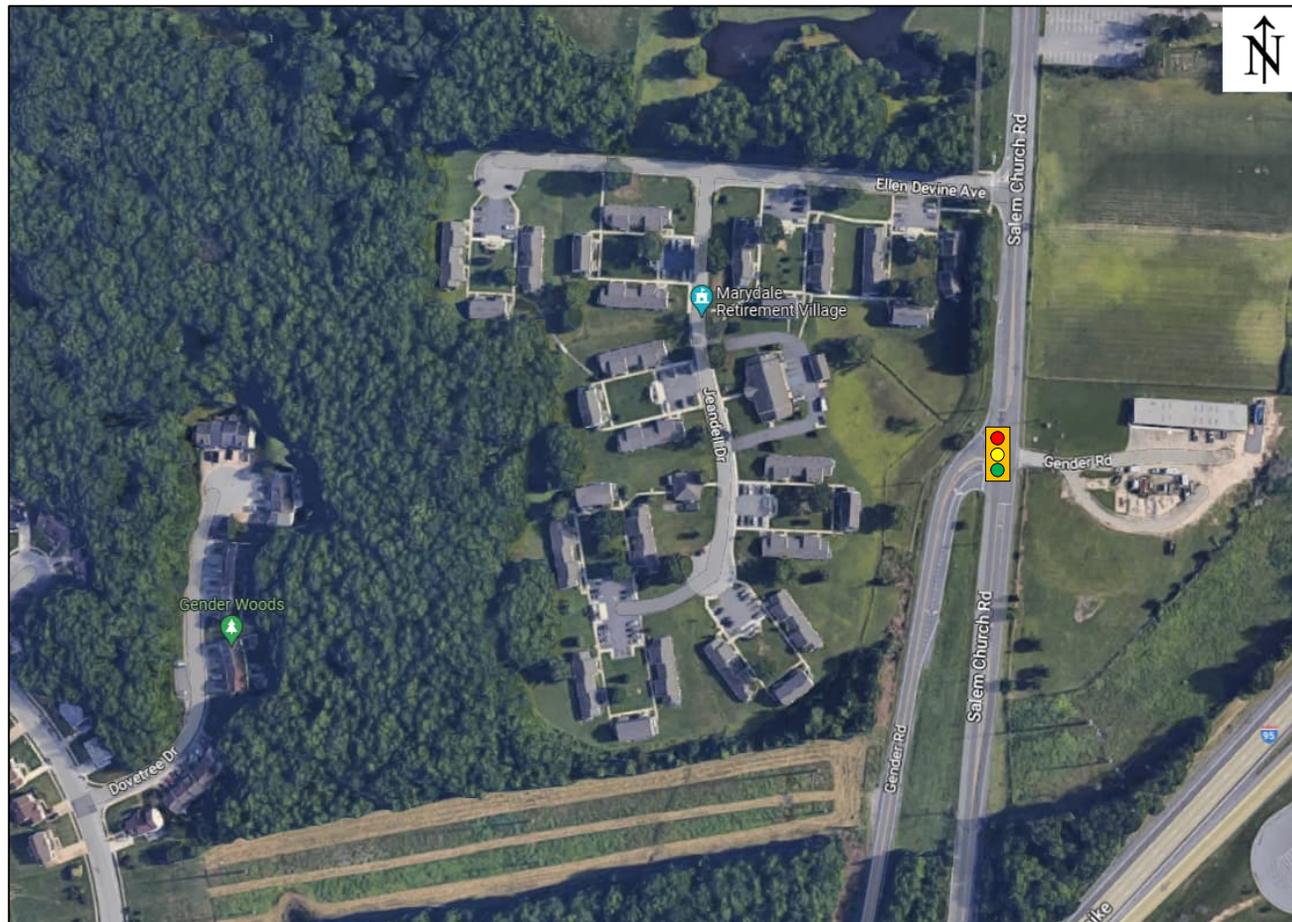
Queues shown in **bold** are significant enough to negatively impact intersection sight distance (once vehicles on Ellen Devine Ave pull beyond stop line)

MUTCD School Zone Compliance Recommendations



RECOMMENDATION:

- Planning-level study to explore opportunities for potential access to signalized intersection
- Given the similarities of the area complaints, study should consider policy recommendations for access mitigation in future development



Next Steps

Location	Recommendation	Assigned To	Status
Salem Church Road (north)	Lower speed limit from 40 mph to 35 mph	DelDOT Traffic	Complete
Salem Church Road Corridor	Work with DP&L to install leased lighting throughout the corridor <ul style="list-style-type: none"> • Install lighting at unlit bus stop at Chapman Road 	DelDOT Traffic	Design Started
Salem Church Road (north)	Coordinate with ISD and DSP about short-term pedestrian signage south of SR 4	DelDOT Traffic	Preparing Recs.
Salem Church Road at SR 4	Install additional northbound left-turn lane	DelDOT Traffic	Design Complete
Salem Church Road at Ellen Devine Drive (Marydale)	Signing/markings improvements	DelDOT Traffic	Markings Installed
Salem Church Road Corridor	Planning-level study of potential access point consolidation/mitigation, intersection control improvements and access, and vulnerable road user connections; including, but not limited to: <ul style="list-style-type: none"> • Potential consolidation and signalization of ISD-area driveways • Providing signalized pedestrian connection at Gender Road • Policy recommendations for access mitigation in future development • Identification of preferred mechanism to fill sidewalk gaps and improve multi-modal infrastructure • Identification of further “mid-block” (unsignalized) pedestrian desire lines and potential solutions including potential long-term corridor pedestrian signage improvements 	DelDOT Planning	Handoff